leading naturalists of the day on the subject, the Royal Commissioners came to the following conclusions :—

1. That the occasion of the removal of these collections to the new buildings now being erected at South Kensington for their reception be taken advantage of to effect a change in the *governing authority and official administration* of that division of the museum.

2. That the director of the natural history collections should be appointed by the Crown, and should have the entire administration of the establishment under the control of a Minister of State, to whom he should be immediately responsible.

Now it is hardly necessary to point out that if the Bill before the House of Commons be passed in its present state (whereby all "the rights, powers, duties, and obligations" of the Trustees of the British Museum are expressly reserved), the recommendations of the Royal Commissioners will be treated as so much waste paper. If the Government appoints a Commission of the best men of the country to advise them on a subject of which they know nothing, it seems to us to be hardly civil to allow an Act of Parliament to be passed in the teeth of their deliberate recommendations without even taking the trouble to explain why these recommendations are not to be carried into effect. Yet this is what is now proposed to be done.

HULL'S GEOLOGY OF IRELAND

The Physical Geology and Geography of Ireland. By Edward Hull, M.A., F.R.S. (London : Stanford, 1878.)

THE great map of the veteran Sir Richard Griffith, followed by the detailed labours of other geologists, especially of the Geological Survey, and of its lamented director, the late J. B. Jukes, has explained the general geological structure of Ireland, and sketched, partly in outline, partly in considerable detail, the curious problems which that structure suggests. As yet, however, the abundant published information to be gleaned from papers and memoirs regarding Irish geology lies chiefly scattered through the *Transactions* of various scientific societies, and the Explanations of the Survey. Some of these publications are not nearly so widely known as they deserve to be, or as they assuredly would be if it were more easy for geological students in general to procure a reading of them. Mr. Hull has, therefore, done good service in preparing this little handbook to the geology and geography of Ireland. It is a most useful compendium of information, and its utility is greatly enhanced by the references to those works and papers where the subjects he discusses are more fully treated.

The volume is divided into three parts. In the first of these the author gives a digest of what is known regarding the geological formations of Ireland. In treating of the palæozoic rocks, he follows Harkness and others in regarding the metamorphic rocks of the north-western counties as the general equivalents of the unaltered Lower Silurian masses of the rest of the island, thus identifying both groups of rocks with those which occupy a similar position in Scotland. In this he is undoubtedly correct, and is quite justified by the sections published by Murchison and others. In these days, however, when almost every dictum of our fathers is called in question, and when able observers on both sides of the Atlantic are loudly proclaiming that they can find no true palæozoic gneiss and schist anywhere; when Alpine rocks—once devoutly regarded as metamorphosed Cretaceous strata—have been pushed back and back till their enemies will not let them have a footing among any even of the palæozoic formations, it certainly would be a good and serviceable piece of work to fix, if possible, by means of fossils, the horizon of the quartzites and limestones of Donegal, and to demonstrate, by numerous transverse sections, that these rocks pass truly, and with no deceptive overturn, beneath the younger gneissose and schistose masses. In Prof. Hull's necessarily brief summary he does scant justice to the Old Red Sandstone. To some extent he makes up for this by the greater fulness of his account of the Carboniferous system, to which he gives considerable interest by the parallelism, suggested by his long experience in Lancashire and elsewhere, between the established divisions of the system in England and the grouping which he has been able to recognise in Ireland. The fragments of Permian and Mesozoic deposits in the north of Ireland are duly mentioned; a more detailed description is given of the huge volcanic plateau of Antrim, and the successive stages of its history; while the Glacial and Post glacial formations receive tolerably ample illustration.

Having laid his foundation of facts, Mr. Hull proceeds, in Part II., to build upon it his explanation of the present physical geography of Ireland. Beginning with the mountains he arranges them in groups, and points out in each case the evidence of their age. The remark just made regarding the metamorphic rocks of Donegal may be repeated here in reference to the alleged age of these north-western mountains. Of course as Upper Silurian rocks lie against them and contain conglomerates derived from them, these heights must be far older than Upper Silurian times. The author assigns them to a long unrepresented interval between the Upper and Lower Silurian periods—a date to which the corresponding Scottish Highlands have also been referred. In dealing with the Wicklow Highlands so admirably worked out by Jukes and his colleagues, Mr. Hull suggests that as the granite there was certainly protruded before the Old Red Sandstone had been laid down, it may even have been earlier than Upper Silurian time, and "therefore synchronous with the mountains of Donegal, Mayo, and Galway." But the Old Red Sandstone of the South of Ireland, thick though it be, seems to represent only the upper member of that system. The vast period of the Lower Old Red Sandstone, so rife elsewhere in subterranean movements and volcanic outbursts, is not known in the south of the island, unless we may conjecture the Wicklow granite to belong to that epoch. The numerous and characteristic ridges and isolated eminences which in the south-western counties and in the central plain rise out of the Carboniferous plain, often with a central core of contorted Silurian rocks, are assigned to an interval of terrestrial disturbance between the Carboniferous and Permian periods. The evidence for this conclusion is fragmentary and has been skilfully marshalled into form by the author; but it cannot be regarded as by any means conclusive. Yet more uncertain is the reference of the Mourne Mountains to the Permian period. That

© 1878 Nature Publishing Group

these heights are remnants of an ancient volcanic centre of later date than the Carboniferous Limestone has been made satisfactorily evident by the careful maps and sections of the Geological Survey. The rocks differ a good deal from those of the Tertiary volcanic region of Antrim. Mr. Hull thinks that they have not the same "appearance of recentness" as the latter, and as Permian volcanic rocks have been recognised in the south-west of Scotland, he thinks it a pity that the Emerald Isle should not have a share of them, and so he would fain regard the peaks of Mourne and Carlingford as the stumps of volcanoes which were blazing in the west when those of the Rothliegende were active in central Germany. All that, in the present state of our knowledge, can be affirmed about these rocks, is that they are later than the Carboniferous Limestone. They may be called Tertiary with about as much probability as Permian.

The wrongs of Ireland go back at least as far as the close of the Carboniferous period. Mr. Hull, with praiseworthy calmness, sketches the process by which his country has been despoiled of its once extensive coal-fields, and, while pointing regretfully to the few little scraps left here and there to tell of former mineral wealth, doomed to irretrievable destruction before either Celt or Saxon set foot upon the land, he consoles us with the just reflection that "the character of the inhabitants and their destiny as an agricultural or pastoral people were fixed altogether independently of social or political considerations." The author, following Jukes in his explanation of the history of Irish rivers, gives some interesting details regarding a few of the principal water-courses of the country. His account of the numerous lakes of Ireland is well arranged, but provokingly brief.

In the third part Prof. Hull deals with the glaciation of Ireland, and presents us with a readable summary of what is known up to this time on that subject, his narrative being accompanied by a small coloured map, on which the chief lines of ice-movement are drawn. Though certain tracts are marked on this map as "snow-fields," it is to be presumed that at the time the rocks were being striated in the directions there indicated, the whole island was one vast snow-field, with no boundary of any kind between the tracts here separated and the rest of the country. In a closing chapter the author brings before his readers the days of the mammoth, red-deer, rein-deer, great Irish deer, wolf, bear, and wild boar. To that venerable Irishman, the *Megaceros hibernicus*, a couple of pages are lovingly devoted, where we learn that the reason why he flourished so abundantly in the sister island was "the absence of many of the natural enemies with which he had to contend in Britain and Europe." Happy days these must have been! Who knows but Megaceros may have lived in brotherhood with the earliest human Irishmen until in after ages the "natural enemies" of both crossed over to them from Britain.

The volume is certain to prove useful. To geologists at a distance it presents in brief and readable form a compendium of all that is most striking and interesting in Irish geology. To those who can avail themselves of the numerous opportunities now afforded of visiting and travelling in Ireland it forms an admirable guide-book. Its appearance before the approaching meeting of the British Association is opportune. No member of the Association who means to see a little of Ireland after the Dublin congress is over should neglect to stow a copy of the book into a corner of his portmanteau.

ARCH. GEIKIE

OUR BOOK SHELF

A Treatise on the Cycloid and all Forms of Cycloidal Curves, and on the Use of such Curves in dealing with the Motions of Planets, Comets, &c., and of Matter projected from the Sun. By Richard A. Proctor. With 161 Illustrations and many Examples. (London: Longmans, 1878.)

THIS is a very full book on the curves enumerated; marked by much elegance in the geometrical portion of the work. It is by far the completest treatise we know, and is likely to take its place as a standard work on the subject. It is marvellous how much can be said about these curves, and one is ready to indorse Chasles' opinion—referring to the cycloid—"Cette courbe merveilleuse." Mr. Proctor only slightly glances at the historical side, and merely refers to Pascal's famous questions, a proof of which, we believe, could hardly, if at all, be effected by purely geometrical methods. Use has been made of De Morgan's article on trochoidal curves, the fullest previous exposition of the properties of these curves in relation to epicyclics, and the work, which is admirably printed, has had the advantage of being embellished with drawings from Mr. Perigal's well-known mechanically-traced curves (bicircloids). One section is devoted to the analytical equations to the curves, and the last section is a reprint of two papers which have already appeared in the *Monthly Notices* of the Astronomical Society, entitled "The Graphical Use of Cycloidal Curves to determine (1) the Motion of Planets and Comets, (2) the Motion of Matter projected from the Sun."

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

The Microphone

THE pleasure with which those beautiful discoveries and inventions, the telephone, the phonograph, and the microphone, have been appreciated by the world, has been unhappily, and I must say I think unnecessarily, marred by one of the most disagreeable things that can be thrust on the public—a personal claim of priority, accompanied by accusations of bad faith, especially when made against any one of whose name and fame the public has come to feel concerned.

Before troubling the public at all with such a matter, Mr. Edison might surely have reasoned out his claim with Mr. Preece, with whom he had been from the beginning in correspondence, or he might have written immediately to public journals, calmly pointing out the close relation between his own "carbon telephone" and Mr. Hughes' subsequent "microphone." The scientific public could then have calmly judged, and would have felt much interest in judging, how much in common or how much not in common there may be in the physical principles concerned in the two instruments. But by his violent attack in public journals on Mr. Preece and Mr. Hughes, charging them with "piracy" and "plagiarism," and "abuse of confidence," he has rendered it for the time impossible for either them or others to give any consideration whatever to his claims. Nothing can be more unfounded than the accusations! Mr. Preece himself gave, at the Plymouth meeting of the British Association last August, a

© 1878 Nature Publishing Group